



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/764,300

01/23/2004

Gregory A. Vogt

NOR197/02410A

8270

24118 7590 06/07/2007
HEAD, JOHNSON & KACHIGIAN
228 W 17TH PLACE
TULSA, OK 74119

EXAMINER

DAVIDSON, DREW ALAN

ART UNIT	PAPER NUMBER
----------	--------------

3709

MAIL DATE	DELIVERY MODE
-----------	---------------

06/07/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/764,300

Applicant(s)

VOGT ET AL.

Examiner

Drew Davidson

Art Unit

3709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02. The oath or declaration is defective because it states, "I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56 (a)." Instead, it should read as follows, --I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56.--

Specification

The disclosure is objected to because of the following informalities. The Brief Description of the Drawings on Page 8 contains an error. The statement, "Figure 6 illustrates an outside perspective view of a connector shown apart from the pins of the connector," should read -- Figure 6 illustrates an outside perspective view of a connector shown apart from the pins of the drive rods--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. Claim 4 recites the limitation " said drive rod string connectors" in line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of further examination, this limitation has been interpreted as, --said plurality of drive rods and plurality of connectors.--

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaiser (Canadian 2,232,925) in view of Hori et al. (U.S. Pat. 5,549,336).

Regarding claim 1:

Kaiser teaches a drive-rod-string/sucker-rod-string (1:6-10) for a progressive cavity pump (1:12-14) comprising:

- a plurality of drive-rods/sucker-rods (item 12 in Fig. 1, see 4:117), each drive-rod/sucker-rod having a pair of opposed ends (3:85-87), wherein each end terminates in a frustoconical-pin/pin-tapered-core (item 22 in Fig. 1, see 4:122-124) having tapered-threading/continuous-pin-thread (item 20 in Fig. 1, see 4:122-124);

- a plurality of connectors/mated-connections (item 29 in Fig. 2, see 4:125-127), each connector/mated-connection attached to one said end of a pair of said drive-rods/sucker-rods, wherein each said connector/mated-connection has a pair of opposed-frustoconical-threaded-recesses/boxes (item 30 in Fig. 2, see 4:125-129).

Kaiser teaches away from both a cylindrical-shoulder/torque-shoulder radially-extending from the frustoconical-pin/pin-tapered-core, and from a pair of opposed mating-shoulders/torque-shoulders on each connector/mated-connection (2:55-62). Hori et al. teach a cylindrical-shoulder-radially-extending-from-the-tapered-pin/external-shoulder (item 5 in Fig. 1, see 2:34-36) mating with a cylindrical-shoulder-radially-extending-from-the-frustoconical-threaded-recess/tip (item 6 in Fig. 1, see 2:34-36). Kaiser and Hori et al. are combinable because they are concerned with a similar technical difficulty, namely the transmission of torque through long strings of slender members connected end-to-end. Hori et al. teach the connection of external shoulder and tip to bear torque (2:52-53). It would have been obvious to a person having ordinary skill in the art at the time applicants' invention was made to add the mating external shoulders (external shoulder mating with tip) taught by Hori et al. (2:34-36) to the drive-rod-string/sucker-rod-string taught by Kaiser, in order to increase the torque-carrying capacity of the drive-rod-string/sucker-rod-string.

Kaiser does not teach an internal-secondary-stop within each said connector/mated-connection. Hori et al. teach an internal-secondary-stop-within-the-connector/internal-shoulder (item 8 in Fig. 1, see 2:35-37, 2:53-59, 2:10-18) acting as a positive stop for the frustoconical-pin/tip (item 7 in Fig. 1, see 2:35-37). Hori et al. teach said internal shoulder to allow the connection to withstand high torque and to effectively reduce tensile stress in the thread connection portion (2:10-18). It would have been obvious to a person having ordinary skill in the art at the time applicants' invention was made to provide the internal shoulder acting as a positive stop for the tip

taught by Hori et al. in the drive-rod-string/sucker-rod-string taught by Kaiser, in order to increase the torque-carrying capacity of the drive-rod-string/sucker-rod-string.

Regarding claim 2:

Hori et al. further teach that the internal-secondary-stop/internal-shoulder (item 8 in Fig. 1) is spaced from the frustoconical-pin/tip (item 7 in Fig. 1) until the frustoconical-pin/tip is elongated from stress (see 2:10-17, 2:53-59; see also the failure mechanism of the Prior Art tool joint in Fig. 2 discussed in 1:38-44). Hori et al. teach said internal shoulder properly spaced from said tip at low torque (hand-tight) so that internal shoulder and tip contact at high levels of torque, thus limiting stress in the thread connection portion and external shoulder (2:10-18) and ultimately increasing the torque capacity. It would have been obvious to a person having ordinary skill in the art at the time applicants' invention was made to space the internal shoulder from the tip until the tip is elongated from stress as taught by Hori et al. in the drive-rod-string/sucker-rod-string of Kaiser as modified in view of Hori et al. in "regarding claim 1," in order to increase the torque-carrying capacity of the drive-rod-string/sucker-rod-string.

Regarding claim 3:

As established in the section "regarding claim 1," a drive-rod-string/sucker-rod-string constructed according to the teaching of Kaiser in view of Hori et al. would have the same structure as that of the drive rod string recited in claim 1. Such a drive-rod-string/sucker-rod-string would necessarily have shoulders of nonzero surface roughness (as all real surfaces have non-zero surface roughness). Non-zero surface roughness implies a nonzero coefficient of friction, which implies resistance to rotational-

movement/relative-sliding-motion. As claimed, there is no patentable structural difference between roughened shoulders and rough shoulders (roughened shoulders per se are not distinguished over rough shoulders, which are necessarily known in the prior art since all surfaces have nonzero roughness).

Regarding claim 4:

As established in the section "regarding claim 1," it would have been obvious to a person having ordinary skill in the art at the time applicants' invention was made, motivated by the need for maximum torque transmission through the drive rod string, to construct the drive rod string according to the teaching of Kaiser in view of Hori et al as recited above in "regarding claim 1." It would have been obvious to a person having ordinary skill in the art at the time applicants' invention was made to optimize the drive rod string according to the teaching of Kaiser in view of Hori et al. in order to accommodate a required torque load, such as that recited in the instant claim.

Alternatively, because the drive rod string constructed according to the teaching of Kaiser in view of Hori et al as recited above in "regarding claim 1" meets all structural limitations of the instant claim, it is intrinsically capable of transmitting the claimed level of torque.

Regarding claim 5:

Kaiser teaches a connector/mated-connection (item 29 in Fig. 2, see 4:125-127) for a pair of drive-rods/sucker-rods (item 12 in Fig. 1, see 4:117), wherein each drive-rod/sucker-rod terminates in a frustoconical-pin/pin-tapered-core (item 22 in Fig. 1, see 4:122-124) having tapered-threading/continuous-pin-thread (item 20 in Fig. 1, see

4:122-124) with substantially-no-undercut/a-short-unthreaded-pin-connection-entrance-section (item 26 in Fig. 1, see 4:122-125), which connector comprises a pair of opposed-frustoconical-threaded-recesses/boxes (item 30 in Fig. 2, see 4:125-129).

Kaiser teaches away from both a cylindrical-shoulder/torque-shoulder radially-extending from the frustoconical-pin/pin-tapered-core, and from a pair of opposed mating-shoulders/torque-shoulders on each connector/mated-connection (2:55-62). Hori et al. teach a cylindrical-shoulder-radially-extending-from-the-tapered-pin/external-shoulder (item 5 in Fig. 1, see 2:34-36) mating with a cylindrical-shoulder-radially-extending-from-the-frustoconical-threaded-recess/tip (item 6 in Fig. 1, see 2:34-36). The cylindrical-shoulder-radially-extending-from-the-tapered-pin/external-shoulder taught by Hori et al. intrinsically possesses a roughened surface since all real surfaces have non-zero surface roughness. Kaiser and Hori et al. are combinable because they are concerned with a similar technical difficulty, namely the transmission of torque through long strings of slender members connected end-to-end. Hori et al. teach the connection of external shoulder and tip to bear torque (2:52-53). A person having ordinary skill in the art at the time applicants' invention was made would have found it obvious to add the mating external shoulders (external shoulder mating with tip) taught by Hori et al. (2:34-36) to the drive-rod-string/sucker-rod-string taught by Kaiser, in order to increase the torque-carrying capacity of the drive-rod-string/sucker-rod-string.

Kaiser does not teach an internal-secondary-stop within each said connector/mated-connection. Hori et al. teach an internal-secondary-stop-within-the-connector/internal-shoulder (item 8 in Fig. 1, see 2:35-37, 2:53-59, 2:10-18) acting as a

positive stop for the frustoconical-pin/tip (item 7 in Fig. 1, see 2:35-37). Hori et al. teach said internal shoulder to allow the connection to withstand high torque and to effectively reduce tensile stress in the thread connection portion (2:10-18). A person having ordinary skill in the art at the time applicants' invention was made would have found it obvious to provide the internal shoulder acting as a positive stop for the tip taught by Hori et al. in the connector/mated-connection between the frustoconical-threaded-recesses/boxes taught by Kaiser, in order to increase the torque-carrying capacity of the drive-rod-string/sucker-rod-string.

Regarding claim 6:

A drive-rod-string/sucker-rod-string constructed according to the teaching of Kaiser in view of Hori et al. as recited above in "regarding claim 1" meets all structural limitations of the instant claim, when the following additional teaching of Hori et al. is incorporated in constructing said drive-rod-string/sucker-rod-string. Hori et al. teach in 2:10-18 and the Table on Page 3 that the internal-secondary-stop-within-the-connector/internal-shoulder (item 8 in Fig. 1) is normally spaced from the frustoconical-pin/tip (item 7 in Fig. 1) when said frustoconical-pin/tip is threaded into the frustoconical-threaded-recess/tubular-body (item 2 in Fig. 1). Hori et al. teach that it is necessary for the internal shoulder to be normally spaced from the tip when tightened firmly by hand, in order to ensure the proper contact of the internal shoulder and tip at high torque, thereby reducing tensile stress in the thread connection portion and stress in the external shoulder and allowing the connection to withstand high torque (2:10-18). It would have been obvious to a person having ordinary skill in the art at the time

applicants' invention was made to normally space the internal-secondary-stop/internal-shoulder from the pin/tip when the pin/tip is threaded into the recess/tubular-body as taught by Hori et al. in the drive-rod-string/sucker-rod-string of Kaiser as modified in view of Hori et al. as recited above in "regarding claim 1," in order to increase the torque-carrying capacity of the drive-rod-string/sucker-rod-string.

Regarding claim 7:

Kaiser teaches a method of driving downhole pumps (see Abstract), whereby the torque transmitted by rotary motion of the sucker-rod-string taught by Kaiser drives a downhole rotary pump such as a progressive cavity pump (see 1:12-14). The drive-rod-string/sucker-rod-string (1:6-10) for a progressive cavity pump (1:12-14) taught by Kaiser comprises:

- a plurality of drive-rods/sucker-rods (item 12 in Fig. 1, see 4:117), each drive-rod/sucker-rod having a pair of opposed ends (3:85-87), wherein each end terminates in a frustoconical-pin/pin-tapered-core (item 22 in Fig. 1, see 4:122-124) having tapered-threading/continuous-pin-thread (item 20 in Fig. 1, see 4:122-124);

- a plurality of connectors/mated-connections (item 29 in Fig. 2, see 4:125-127), each connector/mated-connection attached to one said end of a pair of said drive-rods/sucker-rods, wherein each said connector/mated-connection has a pair of opposed-frustoconical-threaded-recesses/boxes (item 30 in Fig. 2, see 4:125-129).

Kaiser teaches away from both a cylindrical-shoulder/torque-shoulder radially-extending from the frustoconical-pin/pin-tapered-core, and from a pair of opposed mating-shoulders/torque-shoulders on each connector/mated-connection (2:55-62).

Hori et al. teach a cylindrical-shoulder-radially-extending-from-the-tapered-pin/external-shoulder (item 5 in Fig. 1, see 2:34-36) mating with a cylindrical-shoulder-radially-extending-from-the-frustoconical-threaded-recess/tip (item 6 in Fig. 1, see 2:34-36). Kaiser and Hori et al. are combinable because they are concerned with a similar technical difficulty, namely the transmission of torque through long strings of slender members connected end-to-end. Hori et al. teach the connection of external shoulder and tip to bear torque (2:52-53). A person having ordinary skill in the art at the time applicants' invention was made would have found it obvious to add the mating external shoulders (external shoulder mating with tip) taught by Hori et al. (2:34-36) to the drive-rod-string/sucker-rod-string taught by Kaiser, in order to increase the torque-carrying capacity of the drive-rod-string/sucker-rod-string.

It would have been obvious to a person having ordinary skill in the art at the time applicants' invention was made to modify the sucker-rod-string taught by Kaiser in view of Hori et al. as just recited, in order to increase the torque transmission capacity of the sucker rod string and to increase the driving torque and power transmitted to the progressive cavity pump in the method of driving downhole pumps taught by Kaiser.

Prior Art

Prior art made of record but not relied upon is considered pertinent to Applicant's disclosure and consists of three patents. Heppner (U.S. Patent 5,015,162) teaches a drive shaft or sucker rod assembly (item 19 in Fig. 1, see 3:39) for operating a downhole screw-type pump having a rotor and a stator (see the Abstract). MacArthur (U.S. Patent 2,532,632) teaches a high-torque tubing joint for oil drilling having a tapered pin

Art Unit: 3709

and box threaded coupling, including an internal secondary stop normally spaced from the pin until over-torque is applied (see Fig. 9); said secondary stop is taught to prevent damage to the pin from over-torque (see 1:54 to 2:14). Smith (U.S. Patent 4,506,432) teaches a pin and box coupling for connecting joints of drill pipe (rotary earth drilling) in which the threads are nickel-plated, then doped with a zinc-based compound for obtaining a desired friction coefficient. Smith teaches (1:26-35), "The frictional properties of the threaded connections of the tool joint members are important since these frictional properties dictate the amount of torque that can be transmitted by the tool joint. The higher the friction coefficient, the greater the torque transmitting capability and the less the chance of additional makeup occurring down the hole. Insufficient frictional engagement can allow excessive makeup which can burst the box or stretch, crack or completely break the pin."

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Drew Davidson whose telephone number is (571)270-3290. The examiner can normally be reached on Monday through Friday 8:30 AM through 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571)272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3709

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAD
May 21, 2007

D.D.
5/21/07



MARK EASHOO, PH.D
PRIMARY EXAMINER

04/June/07